MYCOTAXON

*Volume 110, pp. 183–187* *October–December 2009*

# A new species of *Gonatophragmium* from Western Ghats, India

Sanjay K. Singh, Lal S. Yadav, Paras N. Singh & Rahul Hepat

*singhsksingh@rediffmail.com*
*Agharkar Research Institute*
*G. G. Agarkar Road, Pune - 411 004, India*

**Abstract** — The new species *Gonatophragmium mayteni*, characterized by forming necrotic leaf lesions and 1-septate, straight conidia, is described on the endemic host *Maytenus rothiana* (*Celastraceae*) collected from Mahabaleshwar forests in Maharashtra State, India.

**Keys words** — fungal diversity, hyphomycetes, taxonomy

## Introduction

The present new fungus was collected during the course of an ongoing programme of exploration of fungal diversity and their selective isolation of unusual or rare fungi from the forests of Western Ghats region in India (Singh et al. 2005, 2008; Das et al. 2007; Waingankar et al. 2008).

During the survey, *Maytenus rothiana*, which is an endemic to Central and Maharashtra-Sahyadris of Western Ghats, was found invariably infected with the fungus in question producing eye-catching necrotic symptoms. This fungus, in severe stage, covers 70–75% of the photosynthetic area of an individual leaf (approximate observation). It produces grayish brown to muddy powdery conidial and mycelial masses on the abaxial surface of the leaf lesions in a circular to irregular pattern. Based on olivaceous conidiophores arising from decumbent hyphae forming a complex system of branching and swollen conidiogenous cells bearing flat denticles and single septate subhyaline to pale olivaceous conidia, this collection is accommodated in the genus *Gonatophragmium* Deighton (Deighton 1969, Ellis 1971) and is described and illustrated as new species.

## Materials & methods

A Nikon Trinocular Stereozoom microscope (Model SMZ-1500 with Digi-CAM) was used to study growing patterns of colonies on lower leaf surface.

Semi-permanent microscopic slides were prepared by making scrape mounts and sections from an infected portion of the leaves. Thin sections were obtained using a SLEE cryostat microtome. For morphotaxonomical details and photomicrographs an OLYMPUS CX-41 microscope was used. Specimens were mounted in lactophenol-cotton blue for microscopic studies. Measurements of fungal structures were taken with an ocular micrometer. Holotype material is deposited in Ajrekar Mycological Herbarium (AMH), MACS' Agharkar Research Institute, Pune, India (AMH, according to Holmgren et al. 1990).

Attempts to culture the described species on artificial media, especially on V-8 Juice Agar, Potato Dextrose Agar, and Potato Carrot Agar (Tuite 1969) were unsuccessful.

## Taxonomic description

***Gonatophragmium mayteni*** S.K. Singh, L.S. Yadav & P.N. Singh, **sp. nov.**

MycoBank MB 514060 (Figs 1–5)

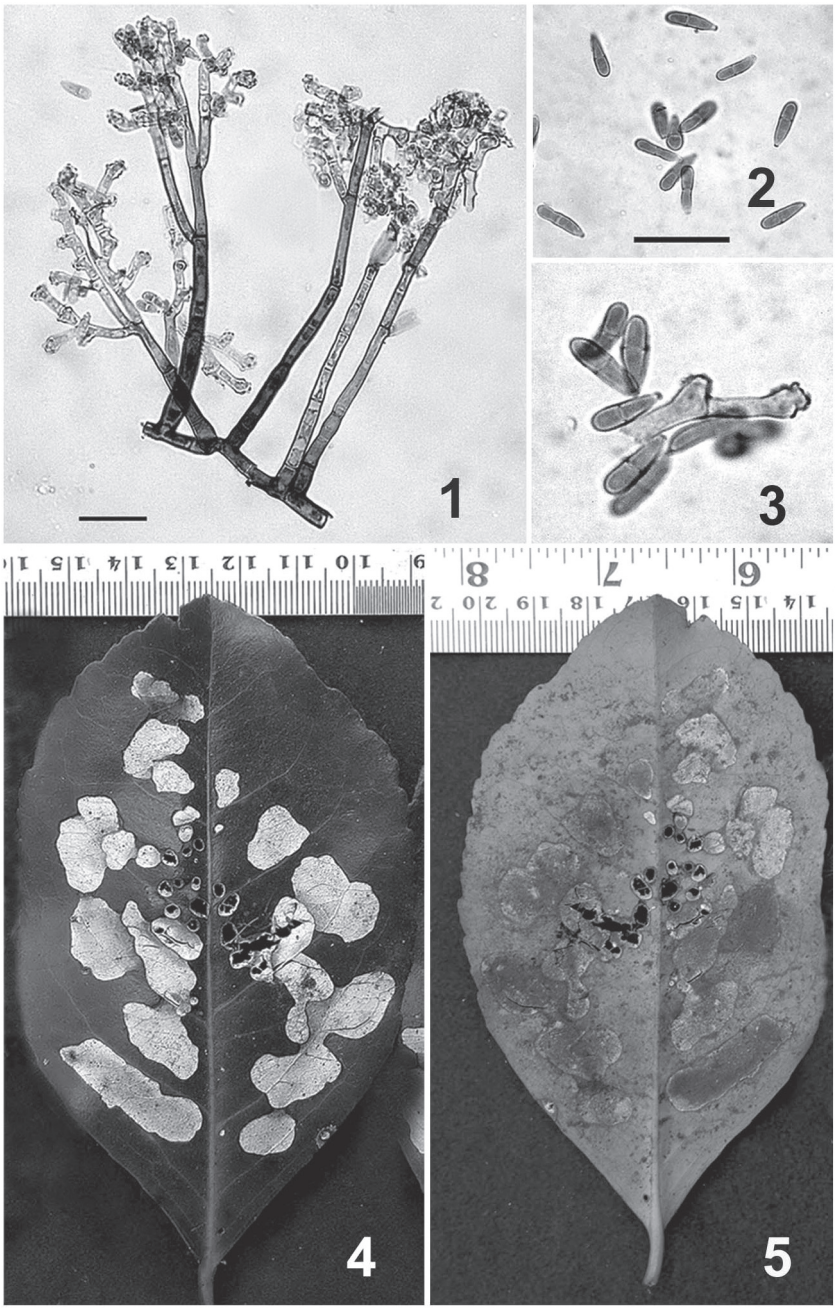
Gonatophragmio epilobii *simile, sed conidiophoris latioribus, 3–7 µm, crassitunicatis, conidiis clavatis, cylindraceis, subhalinis vel pallide olivaceis et hilis truncatis, leviter incrassatis et fuscatis.*

Holotype – on living leaves of *Maytenus rothiana* (Walp.) Ramamoorthy *(Celastraceae)*, India, Lingmala Falls, Mahabaleshwar, Maharashtra, 16 Nov. 2003, *S.K. Singh*, 9273: AMH.

Etymology – *mayteni* refers to the host genus.

Leaf lesions amphigenous, appearing as a single spot or in groups of irregular, necrotic spots, later coalescing to cover large leaf areas, margin grayish white, centre white. Colonies hypophyllus, effuse, powdery, dark brown. Mycelium external, hyphae septate, branched, subhyaline to pale olivaceous, smooth, 3.0–6.5µm wide. Stromata absent. Conidiophores arising from decumbent hyphae, lateral or terminal, solitary to rarely 2–3 in a group, basal part wider than upper part, macronematous, mononematous, multiseptate, branched, erect, smooth and thick-walled, geniculate, nodose on upper half of the conidiophores subhyaline to olivaceous brown, paler towards the apex, 4–6 transversely septate, 60–110 × 3–7 µm. Conidiogenous cells polyblastic, integrated, terminal to intercalary, swollen, variable in length 12–20 µm long bearing 10–15 loci, cicatrized, scars thickened and darkened, plate-like, about 1 µm in diam. Conidia solitary, holoblastic, dry, acropleurogenous, clavate to rarely cylindrical, straight, rarely curved, always 1-septate, smooth-walled,

Figs. 1–5. *Gonatophragmium mayteni*. 1. Conidiophores and conidiogenous cells. 2. 1-septate conidia. 3. Magnified view of conidia and part of conidiogenous cells. 4. Leaf showing necrotic lesions (dorsal view). 5. Leaf showing grayish brown to muddy powdery deposition of conidia and conidiophores over the lesions (ventral view). Scale bar = 20µm.


1
2
3
4
5

subhyaline to light olivaceous, apex rounded, base obconicotruncate, hilum thickened and darkened, 6.0–17 × 2.0–3.0 µm.

Notes–A survey of literature (Ellis 1971, 1976; Braun & Hill 2002, 2008; Tripathi & Tripathi 2003) revealed that there is no species of *Gonatophragmium* described so far on any members of *Celastraceae*. Morphologically the collection on *Maytenus rothiana* is close to *G. epilobii* U. Braun & C.F. Hill (Braun & Hill 2008), described from New Zealand on *Epilobium ciliatum (Onagraceae)*, in having exclusively 0–1-septate conidia. But, the present species differs in having clavate or cylindrical, subhyaline to pale olivaceous conidia with thickened and darkened plate like conidial hilum. Furthermore, the conidiogenous cells have 5–15 conidiogenous loci, which are very prominent and thickened in *G. mayteni*, and the conidiophores are much wider (3–7 µm) and have thicker walls. *Gonatophragmium obscurum* U. Braun & C.F. Hill (Braun & Hill 2002) is distinct from *G. mayteni* in having larger, 0–1(–3)-septate, pale olivaceous or pale yellowish brown conidia. *Gonatophragmium mori* (Sawada) Deighton 1969 (Ellis 1971), *G. mangiferae* J.L. Mulder 1973 (Ellis 1976), and *G. kuanense* A.N. Rai (Rai 1996) are quite distinct from *G. mayteni* in having pluriseptate conidia with different shapes. Nine new species of *Gonatophragmium* have been described by Tripathi & Tripathi (2003), but all of them are characterized by having somewhat curved, pluriseptate conidia. The conidia of *G. moracearum* M.S. Tripathi & V. Tripathi 2003 are somewhat narrower than those of *G. mori*, but all other taxa are morphologically barely distinguishable from the latter species, which occurs, according to Ellis (1971), on a wide range of hosts belonging to various families in tropical countries. Without inoculation experiments or molecular data proving that *G. mori* collections on different substrates are host specific and genetically distinct it is difficult to evaluate and recognize the species described by Tripathi & Tripathi (2003). Hence, based on the above-mentioned differences, it is justified to describe the present collection as a new species.

**Acknowledgements**

We are indebted to Prof. Dr. Uwe Braun, Martin-Luther-Universität, Institut für Biologie, Neuwerk, Halle (Saale), Germany and Dr. Rafael F. Castañeda Ruíz, Instituto de Investigaciones Fundamentales en Agricultura Tropical 'Alejandro de Humboldt (INIFAT), Santiago de Las Vegas, C. Habana, Cuba for kindly reviewing the manuscript. SKS thanks Department of Science and Technology (DST), Government of India, New Delhi for providing financial support under IRHPA programme for setting up state-of the-art National Facility for Culture Collection of Fungi (No. SP/SO/PS-55/2005) at Agharkar Research Institute, Pune, India.

## Literature cited

Braun U, Hill CF. 2002. Some new micromycetes from New Zealand. Mycological Progress 1: 19–30.

Braun U, Hill CF. 2008. New species and new records of foliicolous hyphomycetes from New Zealand. Australasian Mycologists 27(2): 45–56.

Das K, Singh SK, Calonge FD. 2007. Gasteromycetes of Western Ghats, India: 1. A new form of *Phallus indusiatus*. Boletín de la Sociedad Micológia de Madrid 31: 135–138.

Deighton FC. 1969. New genera and species and redispositions of some hyphomycetes, mainly African. Mycological Paper 117: 13–30.

Ellis MB. 1971. Dematiaceous hyphomycetes, CMI, Kew, England.

Ellis MB. 1976. More dematiaceous hyphomycetes, CMI, Kew, England.

Holmgren PK, Holmgren NH, Barnett LC. 1990. Index Herbariorum: part I: The Herbaria of the World. 8th ed. Bronx, NY Botanical Garden.

Rai AN. 1996. A new species of *Gonatophragmium* from the forest flora of the Indian sub-continent. Mycological Research 100: 1263–1264.

Singh SK, Singh PN, Mishra P. 2005. Contribution to the genus *Polychaeton* from South-West India. Journal of Mycology and Plant Pathology 36: 101–103.

Singh SK, Singh PN, Mishra P. 2008. New species of *Passalora* (cercosporoid hyphomycete) from Western Ghats, India. Czech Mycology 60(2): 243–249.

Tripathi MS, Tripathi V. 2003: New insights in species diversity in genus *Gonatophragmium* Deight. pp. 549–577, in GP Rao et al. (eds), Frontiers of fungal diversity in India. International Book Distributing Co. Lucknow.

Tuite J. 1969. Plant pathological methods in fungi and bacteria. Burgese Publishing Company, Minneapolis.

Waingankar VM, Singh SK, Srinivasan MC. 2008. A new thermophilic species of *Conidiobolus* from India. Mycopathologia 165: 173–177.